

Dienstag, 21.06.2011

Hörsaal D, Chemie Zentralbau, 17:15 Uhr

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**Thema: Analysis of ultrafast chemical
processes: on the way from
broadband transient detection to
2D spectroscopy**

Abstract: There is a long standing rivalry between time resolved electronic and vibrational spectroscopy to render the most direct view of the course and mechanism of chemical reactions. I will show that UV-visible-NIR investigations have obtained a strong push by the recent improvements in the generation of fully tunable sub-20 fs pulses for excitation, extremely broadband and stable continua for probing and single-shot detector arrays. In our lab we can already detect spectral signatures from 285 to 1150 nm with sub-50 fs resolution. Through the use of a ns excitation source times scales up to a millisecond are accessible. These methods allow us to progress from unimolecular electron and proton transfer well into bond cleavage processes with partial geminate recombination and into complex photocatalytic reactions. In the latter it is found that the singlet electron transfer constitutes a loss channel, while the productive channel relies on triplet formation. For orthogonal dye chromophores we find that they still have very rapid Förster energy transfer - due to the vibrational distortion of the geometry. Decisive help in the understanding of the most challenging processes can come from 2D spectroscopy. In the visible experiments are already performed with sub-10 fs pulses. The corresponding large coherence width is also needed to progress to the UV with real gain in knowledge. I will briefly report our progress in this direction.

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